Section 945

DYNAMIC STRIPPING TEST OF BITUMEN-AGGREGATE MIXTURES

945.01 Scope

This method covers an agitation test for measuring the retention of a bituminous film by an aggregate in the presence of water. This method shall be confined to Central and Region/District Laboratories.

945.02 Apparatus:

1. Metal cans - Disposable metal cans of 20 ounce capacity such as #303 commercial cans, and 2 quart cans with lids.

2. Balance - A balance with a capacity of 500 g and sensitive to 0.1 g.

3. Spatulas - Two steel spatulas with stiff blades, one approximately 1 inch in width and 4 inches in length, the other approximately 2.5 inches in width and 4 inches in length.

4. Screen - No. 10 sieve size, 6 inches square, to hold samples.

5. Two wooden strips, ½ inch wide, ½ inch thick, and 4 inches in length to support the screen.

6. Hard, nonabsorbent paper to receive drained bitumen.

7. Soft-textured, absorbent paper, #202 filter paper or equivalent, to dry aggregate.

8. Containers - Glass or polystyrene containers of 17 ounces capacity, such as jars or beakers.

9. Drying Oven - A thermostatically-controlled oven capable of maintaining a temperature of 230 ± 41 EF.

10. Paint shaker - Red Devil paint shaker, Model #30, or equivalent.

945.03 Materials

1. Aggregate - The aggregate used shall be unwashed and oven-dried to constant weight at a temperature of 230 ± 41 EF. The aggregate shall pass a 3/4 inch sieve and be retained on the No. 4 sieve.

2. Bitumen - The bituminous material shall be that proposed for use on the project. If no type of bitumen has as yet been designated for use, stripping tests shall be performed with AC-20 viscosity graded asphalt.

3. Water - The distilled or tap water used in conducting the stripping test shall have a ph of

6.0 to 8.0. No electrolytes of any kind shall be added to the water to obtain the required ph.

4. Hydrated lime, 1%.

945.04 Test Procedure

For each determination, one stripping test shall be performed. The asphalt shall contain no anti-stripping agent. Each test shall be performed as follows:

1. Place 150 g of the representative aggregate sample in a disposable metal can. Add 50 g of bitumen, which shall have been preheated to a temperature at which it will pour easily.

2. Mix the bitumen and aggregate with the narrow, stiff spatula until all aggregate particles are completely coated. The bitumen-aggregate mixture may be heated in the oven to facilitate mixing. The temperature shall be approximately 125 EF for liquid asphalt and 200 EF for asphalt cement. Emulsions shall not be heated.

3. Place the sample on the elevated screen, and allow the excess bitumen to drain off. Permit the sample to cure at room temperature (70 to 84 EF) for 24 hours.

4. After curing, scrape the sample off the screen with the wide, stiff unheated spatula, and place it in a glass or polystyrene container. Immerse the sample in water, and allow it to stand at room temperature for 24 hours.

5. Remove the sample from the glass container, being careful not to disturb the bond between the bitumen and the aggregate, and place it in the 2 quart can. For those samples that cannot be easily removed from the glass containers the following procedure shall be used:

   (a) Invert the glass container with the sample.

   (b) Allow a stream of warm water to run over the container until the sample is loosened from the glass.

6. Fill the 2 quart can, containing the sample, completely with tap or distilled water, and seal it with the lid. Place the can on the paint shaker, and allow it to be agitated for l0 minutes. After this time, remove the can from the paint shaker. Let the water drain off, and decant the loose bitumen from the sample.

945.05 Addition of Lime to Aggregate:

The addition of hydrated lime may improve the stripping characteristics of some aggregates. The procedure shall be as follows:

1. Add one part of lime (by weight) to two parts of water (by weight), and mix thoroughly.

2. Add this mixture to the dry aggregate in the amount of 1% lime (by weight), and mix thoroughly. Allow the aggregate to cure in an open can for 24 hours.

3. After the curing period, test the aggregate as outlined in subsection 945.04, except anti-stripping agent.

945.06 Evaluation

Visually, the amount of stripped aggregate shall be inspected and shall be estimated at either zero to 10 percent, satisfactory; 10 to 25 percent, marginal; or greater than 25 percent, unsatisfactory.

945.07 Precaution:

Be sure the 2 quart can is filled completely with water and the lid is securely in place, before placing the can on the paint shaker. When filling the 2 quart can do not spray water directly on the mix.